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CT MS4 General Permit:
Impaired Waters Monitoring

IDDE Workshop

September 27, 2017

MS4 Permit – Monitoring Requirements

Outfall water quality monitoring in the 2017 MS4 Permit

… has changed since the 2004 MS4 Permit

… is different than IDDE outfall screening & sampling

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Monitoring Requirements – What's Changed?

2004 Permit

- Monitor 6 representative outfalls every year during a rain storm

2017 Permit

- Outfall sampling for discharges to impaired waters only
- Representative outfall sampling in last 2 years of permit
- Outfalls that exceed thresholds are targeted for further investigation and/or BMPs

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What are “Impaired Waters”?

Surface waters that do not meet state water quality standards for certain uses like recreation or aquatic life

Connecticut DEEP Waterbody Assessments, Recreational Use Support

Map of Connecticut DEEP Waterbody Assessment Segments showing Recreational Use Support

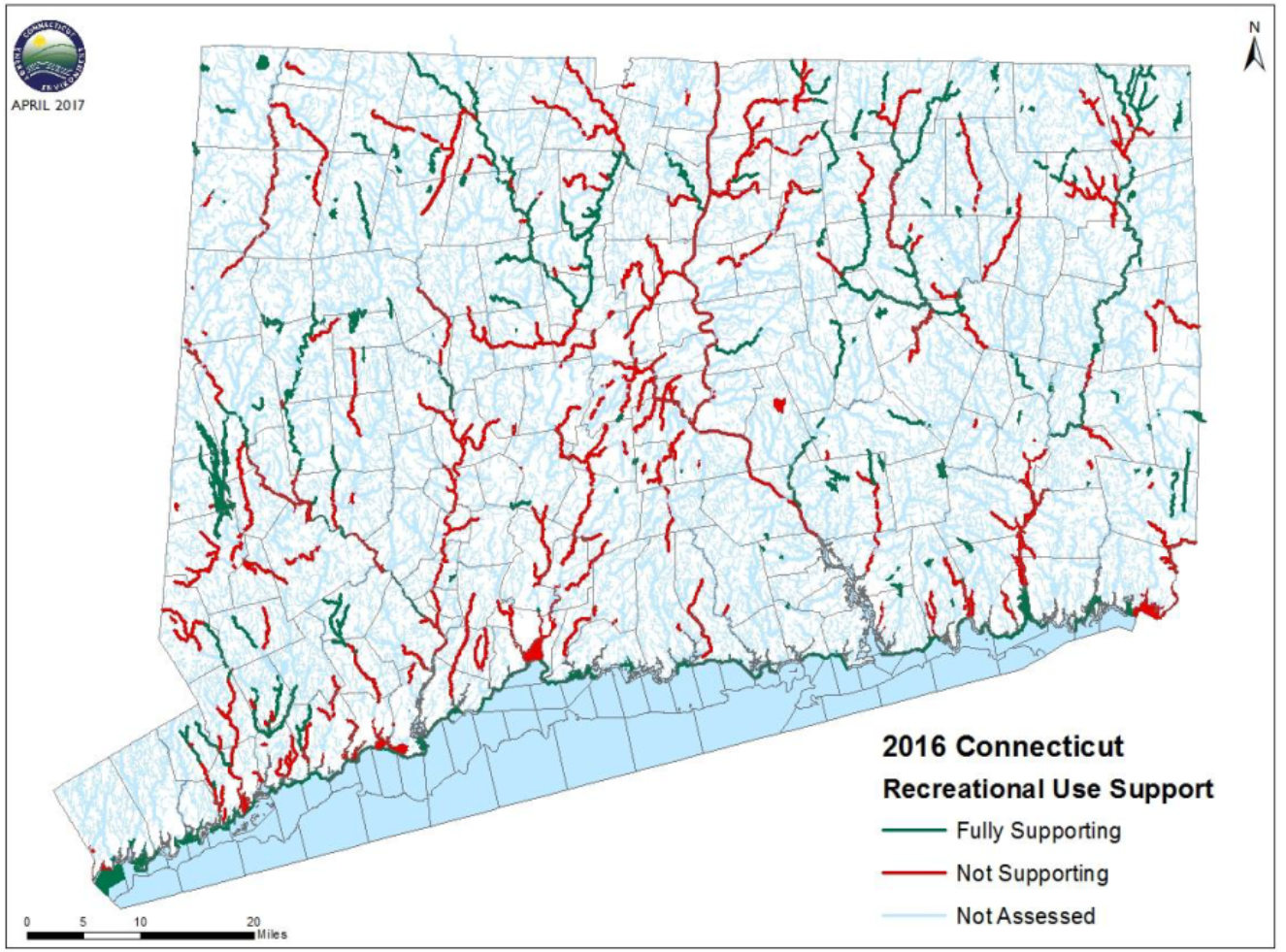


Figure 2-3. Waterbody segments assessed for Recreational Use Support (REC)

Outfall Monitoring is not IDDE Screening

Outfall Monitoring

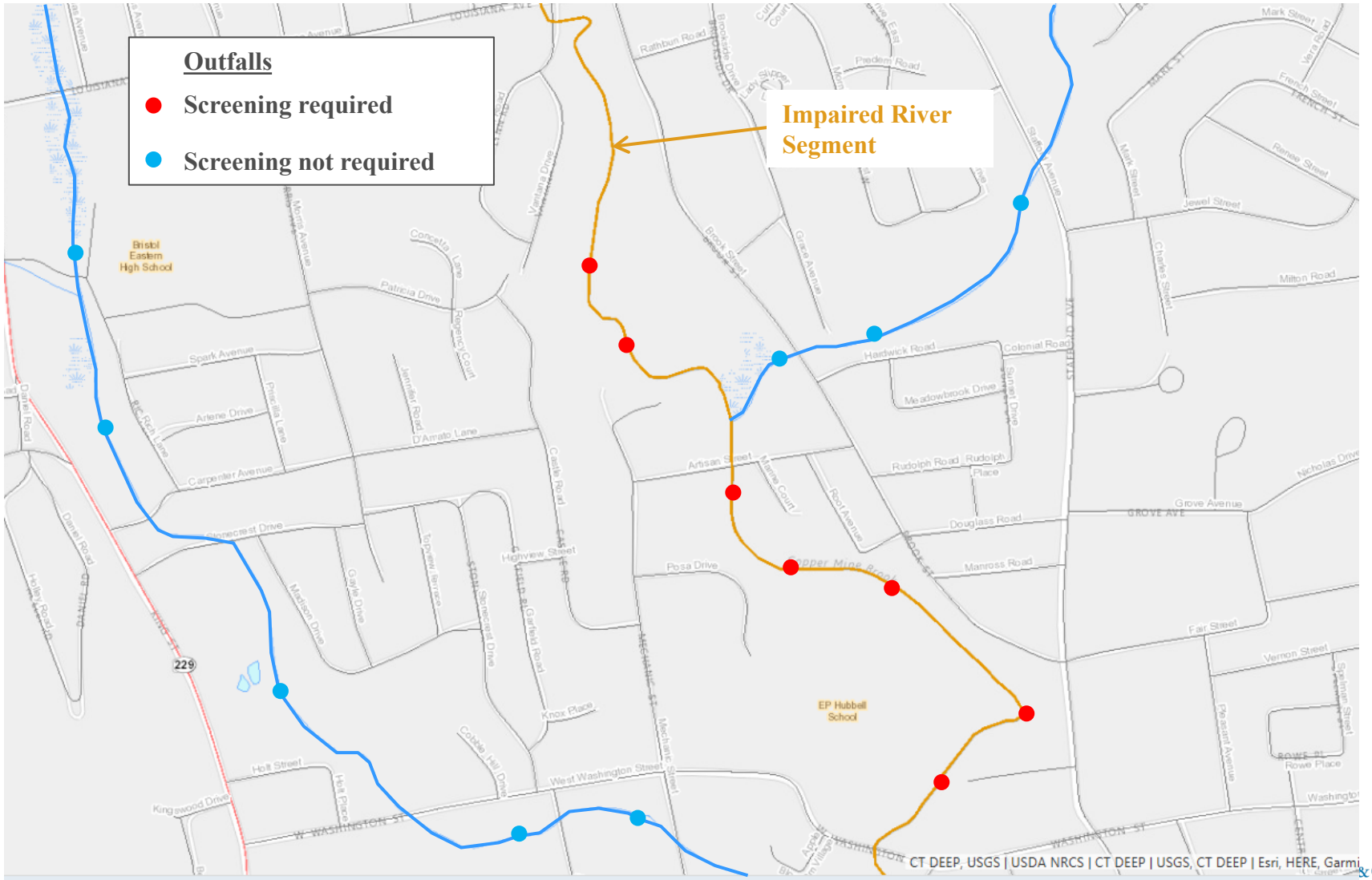
- Focus on stormwater discharges
- Wet weather
- All outfalls to impaired waters
- Stormwater pollutants of concern

IDDE Screening

- Focus on illicit discharges
- Dry weather and wet weather
- Outfalls in priority areas (high and low priority catchments)
- Illicit discharge parameters and stormwater pollutants of concern

Impaired Waters Monitoring Requirements

Screen (i.e., sample) outfalls discharging directly to impaired waters



Impaired Waters Monitoring Requirements

Outfall Screening

- Collect sample during a rain event – wet weather
- Sample only for “pollutants of concern”
- If you have sampling results for an outfall from 2004 MS4 Permit sampling or other wet weather sampling, do not need to screen again

Wet Weather Sampling Criteria

- Single grab sample taken within first 6 hours of discharge*
- Any rain storm that produces a discharge from the outfall being monitored
- At least 48 hours after any previous rain storm that produced a discharge from the outfall*
- Some snow or ice melt can be present, cannot be snow or ice melt alone

*Different than the CTDEEP Industrial Stormwater General Permit

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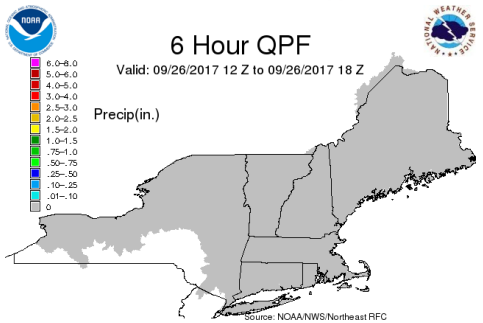
Weather Monitoring Resources

- National Weather Service (NWS) Forecast Offices
  - Boston http://www.weather.gov/box/
  - New York http://www.weather.gov/okx/
- Quantitative Precipitation Forecasts (QPFs), multi-day assessment of the probability of precipitation

  https://www.weather.gov/nerfc/ForecastPrecipitation
- After an event, to check storm totals, 24-hr precipitation information is available at:
  - https://www.weather.gov/nerfc/ObservedPrecipitation
  - https://www.weather.gov/nerfc/ObservedPrecipitationText
- Prior day weather information (including precipitation):
  - http://w2.weather.gov/climate/index.php?wfo=box
- Commercial weather vendor websites



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Outfall Sample Collection Procedures

Direct Collection (preferred method)

- Fill bottles with flow from outfall
- Avoid touching the outfall pipe with the lip of the bottle
- Avoid disturbing bottom sediments or biofilm on inside of pipe
- If outfall is inundated or inaccessible, collect sample at nearest upstream location (typically in a manhole)

Outfall Sample Collection Procedures

Pole or Swing Sampler ($150)

- Use where direct collection is not possible (extends up to 24 feet)
- Use dedicated 1000 mL wide mouth sample bottle for use at each location
- Requires decontamination between sample locations
- If outfall is inundated or inaccessible, collect sample at nearest upstream location (typically in a manhole)

Clean Sampling Techniques

- Never re-use sample bottles
- Wear powder-free nitrile or latex gloves
- Change gloves if soiled or if potential for cross-contamination
- Do not touch the inside of the bottle or cap. Do not put the cap on the ground.
- No eating, drinking, or smoking or chewing tobacco during sample collection
- After each sample is collected, record the sample time and immediately place the bottles on ice in a cooler

Sample Analysis – Phosphorus & Nitrogen

Collect samples to deliver to lab or use portable N & P meter (requires digester)

Pollutant of Concern	Threshold for Follow-up Investigation
Nitrogen	Total Nitrogen > 2.5 mg/L
Phosphorus	Total Phosphorus > 0.3 mg/L

Sample Analysis – Bacteria

Collect samples to deliver to lab (6-hour hold times)

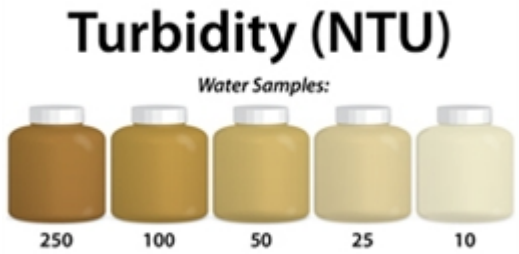
Receiving Water	Indicator Bacteria	Threshold for Follow-up Investigation (colonies per 100 ml)
Freshwater Class AA, A and B surface waters	E. Coli	>235 for swimming areas >410 for all others
	Total Coliform	>500
Marine Class SA and SB surface waters	Fecal Coliform	>31 for Class SA >260 for Class SB
	Enterococci	>104 for swimming areas >500 for all others

*** No follow-up investigation needed if outfall exceeded levels *solely* due to natural sources (e.g., wildlife or runoff from <u>undeveloped</u> wooded area)**

Other Pollutants of Concern

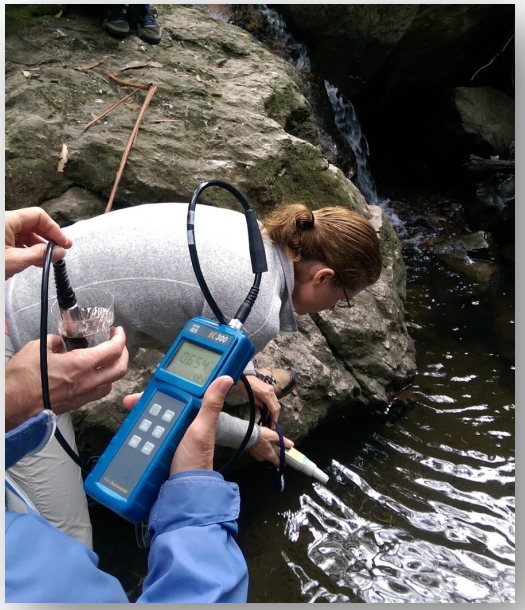
- **Collect samples from outfall and in-stream immediately upstream of outfall**
- **Measure turbidity using portable meter**

Pollutant of Concern	Threshold for Follow-up Investigation
Other (turbidity)	Difference between Outfall and Upstream Sample > 5 NTU



In-Stream Sample Collection

- Place probe at 1/2 water depth where stream depth is greater than one foot
- If water depth too shallow to fully submerge the probe, collect water in a clean, spare, sample bottle or graduated cylinder
- Sample mid-stream
- Use pole sampler and dedicated bottle if unsafe to enter stream
- Use waders (and PFD) or hip boots, as necessary
- Two-person team recommended



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Sample Handling and Custody

Laboratory analysis

- Place samples in cooler with ice
- Transport samples to laboratory immediately (6-hour hold time for bacteria)
- Complete and follow Chain-of-Custody procedures

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❑ 275 Promenade Street, Suite 350, Providence, RI 02908
❑ 80 Washington Street, Suite 301, Poughkeepsie, NY 12601

CHAIN-OF-CUSTODY RECORD 25711

Turnaround
❑ 1 Day* ❑ 3 Days* ❑ Other _____ (days)
❑ 2 Days* ❑ Standard (____ days) *Surcharge Applies

PROJECT NAME | PROJECT LOCATION | PROJECT NUMBER | LABORATORY

REPORT TO:
INVOICE TO:
P.O. NO.:
Sampler's Signature: Date:

Source Codes:
MW=Monitoring Well PW=Potable Water S=Soil W=Waste
SW=Surface Water T=Treatment Facility B=Sediment A=Air
X=Other _____

Analysis Request | Containers

Item No.	Transfer Check 1 2 3 4	Sample Number	Source Code	Date Sampled	Time Sampled

Soil VOA Vial, [ ] methanol
Soil VOA Vial, [ ] water
Glass Soil Container ( ) oz [ ] Na_2SO_3
Glass Soil Container ( ) oz
Other
Water VOA Vial, [ ] As is [ ] HCl
Glass Amber ( ) ml, [ ] As is [ ] H_2SO_4
Plastic - As is, [ ] 250 ml [ ] 500 [ ] 1000 ml
Plastic - H_2SO_4, [ ] 250 ml [ ] 500 ml
Plastic - HNO_3, 250 ml [ ] Filtered [ ] Unfiltered
Plastic - NaOH, 250 ml
Comments

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Follow-up Investigations

Investigate activities within the drainage area

- **Land use or development patterns**
- **Business or commercial activities**
- **Industrial activities**
- **DCIA**
- **Natural contributors**
- **Potential MS4 maintenance issues**
- **Residential activities**

Visual assessments

Implement BMPs

Prioritized Outfall Monitoring

Screen ½ impaired outfalls

Select 6 outfalls with highest contributors of pollutants of concern

Sample these annually

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Impaired Waters Monitoring Schedule

Program Element	Deadline				
	Year 1	Year 2	Year 3	Year 4	Year 5
Wet Weather Outfall Screening: Start	X	X			
Wet Weather Outfall Screening: ≥ 50%			X	X	
Wet Weather Outfall Screening: 100%					X
Start Follow-up Investigations		X	X		
Start Prioritized Outfall Monitoring (6 locations)				X	X

X Existing 2004 MS4 permittees
X New MS4 permittees

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Wet Weather Monitoring – Lessons Learned

Wet weather monitoring has its unique challenges

- Start early, don't put off monitoring until the year it's due
  - Field work always takes longer in the rain
  - It never seems to rain during normal working hours
- Invest in up-front training for field staff
  - Your data (information) is only as good as your field team
- Decide how your are going to manage the data before you get started
  - Paper ➡ Spreadsheet ➡ GIS/Geodatabase

Questions / Discussion

Contact Information:
Erik Mas, P.E.
Vice President
emas@fando.com
800.286.2469 x4433

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